Cosmetic compositions with decorative and antimicrobial effects contain bioactive glass, colored glass, glass-ceramic, glass powder, glass-ceramic powder and/or a glass/nanoparticle composite

Patent number: DE10322444 (A1)

Publication date: 2003-10-16

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Classification:

- international: ***A61K8/02; A61K 8/25; A61Q1/02; A61Q1/06; A61Q1/10; A61Q17/04; A61Q3/02; A61Q5/02;*** **A61K8/02; A61K8/19; A61Q1/02; A61Q17/04; A61Q3/02; A61Q5/02;** (IPC1-7): A61K7/00; A61K7/02; A61K7/027; A61K7/031; A61K7/032; A61K7/043; A61K7/06; A61K7/42; A61K7/48

- european: A61K8/02F, A61K8/25, A61Q1/02, A61Q1/06, A61Q1/10, A61Q17/04; A61Q3/02; A61Q5/02; Y01N2/00

Application number: DE20031022444 20030519

Priority number(s): US20020383065P 20020523

Abstract of DE **10322444 (A1)**

Sun-cream, eye-shadow, hair shampoo, lipstick, face mask, make-up foundation cream, nail lacquer and rouge compositions each contain 0.01-30 (especially 0.01-5) wt.% of a bioactive glass, colored glass (composition), glass-ceramic, glass powder, glass-ceramic powder and/or a glass/nanoparticle composite.

Result Page

The invention relates to formulations of cosmetic products with bioactive glass or colored glasses or glass powder or colored glass powder or glass ceramic powder or composite materials comprising glass and nanoparticles.

Antimicrobial acting glasses are become known from a variety of writings.

Thus 5.290.544 water-soluble glasses for the applications in cosmetic products with very small become SiO2 and very high B2O3 and/or in US. high P2O5-Gehalten described. The glasses point silver concentrations of large 0.5 Gew. - % up. These glasses possess an extreme low hydrolytic resistance and are inclined to dissolve in water complete. The here freed AG and/or cu ions work antibacterially. Also in the JP-A-92178433 becomes a water-soluble glass powder with SiO2 < 37 Gew. - % as polymer additive with high silver concentrations > 1 Gew. - % described.

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In US 6.143.318 silver-containing Phosphatgläser described, which become used as antimicrobial material for the Wundinfektionsbehandlung with combinations from cu, Ag and Zn, become. Here it concerns likewise water-soluble glasses, which exhibit low SiO2-Konzentrationen and very high P2O5-Gehalte.

These glasses are suitable due to their low hydrolytic resistance only very limited for a grinding in aqueous mediums.

Antimicrobial silver-containing Borosilikatgläser and/or. Borophosphatgläser become 2000203876 described in the writings JP 10218637, JP 08245240, JP 07291654, JP 03146436, JP 2000264674, JP. These glasses exhibit to a large extent a good hydrolytic resistance and can therefore in aqueous mediums milled become.

Zeolites, which find silver, which becomes contained introduced by ion exchange, likewise as antibacterial agent use. This becomes for example in US 6.245.732 and WHERE 0038552 described.

Heavy metal-free glasses, with which an antimicrobial effect can become detected, are in the DE 199 32 238, the DE 199 32 239 and the WHERE 01/03650 described.

With from the DE 199 32 338, the DE 199 32 239 as well as the WHERE 01/03650 known the glasses it acts itself around bioactive glasses with a significant phosphorus portion > 1 Gew. - %.

The essential characteristics of bioactive glass are the person skilled in the art known and for example in the USA 5.074.916 described. Afterwards bioactive glass differs from conventional Lime sodium Silicat glasses by the fact that it binds living tissue.

Bioactive glass referred for example a glass, which is received a solid connection with body tissue, whereby a hydroxyl apatite layer becomes formed. Bottom bioactive glass becomes also a glass understood that antimicrobial and/or antiinflammatory effect shows.

Colored glasses mark glasses, which exhibit a color effect. This color effect can become the Beigiel by ions or nanoparticles, for example metal or semiconductor nano-particle generated. The colored glasses become the dye of the cosmetic products or the UV and/or IR absorption used.

Object of the invention is it, formulations of cosmetic products with bioactive glasses or colored glasses or colored glass powders or glass powders or glass ceramic powders or composite materials a comprising glass and nanoparticles. In particular the glass powder should eirr bioactive glass cover, for example an antimicrobial glass be.

This object becomes by a cosmetic formulation in accordance with one of the claims 1 to 8 dissolved.

According to the invention concerns it here the most diverse cosmetic formulations as for example Colour cosmetics, skin care, hair care, Sonnencremen, eyelid shade, Haarwaschmitteln, lipsticks, face masques, make-up compositions, nail lacquer compositions, Rouge compositions, shaving lotions, shaving foam, mouthwash, primers, MASK era, nail cream, face propellant and face cream.

The cosmetic compositions according to invention contain bioactive glass or glass powder or glass ceramic powder or composite materials comprising glass and nanoparticles, which prefered in industrial yardstick with standard methods prepared to become to be able.

Those the cosmetic compositions of admitted glasses and/or. Glass powders or glass ceramic powders or Komposit compositions cover glasses, which cover prefered subsequent components:
SiO2: 35-80 Gew. - %
Na2O: 0-35 Gew. - %
P2O5: 0-80 Gew. - %
MgO: 0-5 Gew. - %
Ag2O: 0-0.5 Gew. - %
AgJ: 0-0.5 Gew. - %
NaJ: 0-5 Gew. - %
TiO2: 0-5 Gew. - %
K2O: 0-35 Gew. - %
ZnO: 0-10 Gew. - %
Al2O3: 0-25 Gew. - %
B2O3: 0-25 Gew. - %

Further the basic glass in accordance with above composition ions can such as Fe, CO, CR, V, Ce, cu, Mn, Ni, Bi, SN, Ag, outer one, J single or in sum up to 10 Gew. - % added become the achievement bspw. a color effect, an antimicrobial or antiinflammatory effect.

A colored glass composition can be as follows:
SiO2: 35-80 Gew. - %
Na2O: 0-35 Gew. - %
P2O5: 0-80 Gew. - %
▲ top
MgO: 0-5 Gew. - %
Ag2O: 0-0.5 Gew. - %
AgJ: 0-0.5 Gew. - %
NaJ: 0-5 Gew. - %
TiO2: 0-5 Gew. - %
K2O: 0-35 Gew. - %
ZnO: 0-10 Gew. - %
Al2O3: 0-25 Gew. - %
B2O3: 0-25 Gew. - %
SnO: 0-5 Gew. - %
CeO2: 0-3 Gew. - %
Outer one: 0.001-0.1 Gew. - %

Prefered embodiments of such basic glasses are in the appendix in table 1 indicated.

The basic glasses can become also the preparation of composite materials with nanoparticles used. Such nanoparticles are bspw. TiO2, ZnO; ZrO2, metallic silver or gold. Such nanoparticles are small 500 Nm, small 200 Nm, small 100 Nm, small 50 Nm, prefered small 10 Nm. The weights of the nanoparticles at the Komposit composition are small 30 Gew. - %, small 15 Gew. - %, small 5 Gew. - %, prefered small 1 Gew. - %, particularly prefered small 0.1 Gew. - %.

The glasses can become in different grinding mediums, for the example waters, glass powder milled, since a sufficient hydrolytic resistance exhibits.

Bottom glass powders become understood in present application also granulates and glass beads.

The glass powders show biocides opposite bacteria, funguses as well as viruses and/or. a biostatic effect; toxicological acceptable and in particular also to the consumption suitable is strike compatible in the contact with the humans.

Due to the requirements to the toxicological safety of the glass powder as well as their suitability to the consumption the glass powder is particularly pure. The load by heavy metals is small. Thus the maximum concentration in the range of the cosmetic formulations preferably amounts to for Pb < 20 ppm, CD < 5 ppm, As < 5 ppm, self-service < 10 ppm, Hg < 1 ppm, Ni < 10 ppm.

By the use of antimicrobial glass powders a preservation of the cosmetic compositions can and/or. Formulations themselves achieved or an antimicrobial effect outward achieved become.

Since in the range of cosmetic compositions skin irritations play a substantial role, it is favourable, if the glass powder, in particular with antimicrobial properties, is strike friendly.

It is particularly favourable, if the glass powders exhibit the indicated cosmetic compositions an antimicrobial effect. With certain glass powders a dependence of the average particle size of the glass powder of the antimicrobial effect is given. The smaller the average particle size, the the high antimicrobial effect because of the increase of the reactive surface of the glass.

With glass powders with antimicrobial effect alkalis of the glass become by H + - ions of the aqueous< medium> exchanged by reactions at the surface of the glass. The antimicrobial effect of the ion exchange is based among other things on an increase of the pH value and the osmotic effect on microorganisms.

Ion exchange-cash glass powders according to the invention work metal ion, as for example an alkali or an earth alkali metal ion and the H in aqueous mediums antimicrobial by pH value increase by ion exchange between< +> - ions of the aqueous solution as well as by ion-conditional impairment of the cell growth (osmotic pressure, disturbance of metabolic procedures of the cells).

The particle sizes of the glass powders are prefered < 100 mu m, convenient < 50 mu m and/or. 20 mu M. Particularly suitable is particle sizes < 10 mu m as well as small 5 mu M. As whole particularly suitable particle sizes have themselves < 1 mu m put out.

Mixtures of various glass powders from the composition range with different compositions and grain size are possible, in order to combine certain effects.

Depending upon particle size, concentration and the composition of the powder pH values of up to 13 achieved become.

Like before performed are, the glass powders of the different cosmetic compositions strike-compatibly also with high concentrations with high pH values.

▲ top In place of glasses and/or. Glass powders know also glass ceramic and/or. Glass ceramic powders used become, whereby the output glasses cover the prefered indicated above components. The crystalline main phase of the glass ceramics consist of alkali alkaline-earth silicates and/or alkaline-earth silicates and/or alkali silicates.

The glass ceramic and/or. the glass ceramic powder is characterised by the fact that it shows a defined strewing and reflection effect in the visible wavelength range of the light. This can decrease the visual appearance with cosmetic application of skin folds. Further the glass ceramic shows biocides, an in any case biostatic effect opposite bacteria, funguses as well as viruses. The glass ceramic is however strike compatible in the contact with the humans and toxicological acceptable.

With use of glass ceramic in the cosmetic range the maximum concentration at heavy metals is for example for Pb < 20 ppm, CD < 5 ppm, As < 5 ppm, self-service < 10 ppm, Hg < 1 ppm, Ni < 10 ppm.

The unkeramisierte output glass, which becomes according to invention used for the preparation of the glass ceramic, contains SiO2 as a non-columnar between 35-80 Gew. - %. With lower concentrations the spontaneous crystallization inclination strong decreases to and the chemical resistance strong. With higher SiO2-Werten crystallization stability can decrease and the processing temperature becomes significant increased, so that the hot shaping characteristics worsen. In addition SiO2 is ingredient with the Keramisierung resultant crystalline phases and must, if high crystalline phase portions by the Keramisierung adjusted to become to be supposed, in corresponding high concentrations in the glass be contained.

Na2O becomes used as flux when melting the glass. With concentrations of small 5% the fusion behavior becomes negative affected. Sodium is ingredient itself with the Keramisierung formed phases and must, if high crystalline phase portions by the Keramisierung adjusted to become to be supposed, in corresponding high concentrations in the glass be contained. K2O works as flux when melting the glass. In addition potassium in aqueous systems becomes dispensed. Couches high potassium concentrations in the glass forwards, become kaliumhaltige phases such as calcium silicates likewise excreted.

Over the P2O5-Gehalt the chemical resistance of the glass and thus the ion delivery in aqueous mediums can become adjusted with silikatischen glasses, glass ceramics or composites. With Phospahtgläsern P2O5 is network pictures. The P2O5-Gehalt lies between 0 and 80 Gew. - %.

In order to improve the fusibility, the glass up to 25 Gew can. - % B2O3 contain.

Al2O3 will used, in order to adjust the chemical resistance of the glass.

To the gain the antimicrobial, in particular the antibacterial properties of the glass ceramic knows antimicrobial acting ions

such as z. B. Ag, outer one, I, Ce, cu, Zn in concentrations of small 5 Gew. - % contained its.

Colorgiving ions such as z. B. Mn, cu, Fe, CR, CO, V, know single or combined 1 Gew small in a total concentration. - % contained its.

Usually the glass ceramic in powder form becomes used. The Keramisierung can either with a glass block and/or. Glasribbons take place or however with glass powder. After the Keramisierung must the glass ceramic blocks or Ribbons powder milled become. If the powder was keramisiert, also again milled must become if necessary, in order to remove agglomerates, which would develop during the Keramisierungsschrittes are.

The grinding cannot become both drying and in aqueous or aqueous grinding mediums performed.

Usually the particle sizes small 500 mu M. lie. As convenient particle sizes have themselves < 100 mu m and/or. < 20 mu m proved. Particularly suitable is particle sizes < 10 mu m as well as small 5 mu m as well as small 2 mu M. As whole particularly suitable particle sizes have themselves < 1 mu m put out.

Mixtures of various glass powders from the composition range with different compositions and grain size are possible, in order to combine certain effects.

Light faithful effects to the achievement of optical effects such as transparency, reflection, scattering result from the different computation indices of glass phase and crystal phase as well as the adjusted crystallite sizes.

When dissolving the crystalline phase in waters or aqueous solution wabenförmige surface structures stay, which in particular the optical properties such as transmission, reflection and light scattering of the powders in formulations to affect. The powders are suitable due to the light faithful effects for soft focus applications.

The invention is to become subsequent on the basis the embodiments described.

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The embodiment 1 gives a sun protective creme composition on with glass powders with a particle size < 1,6 mu m and glass powders with a particle size < 0,77 mu M. Altogether four formulations are indicated.

Embodiment 1

Sun protective creme compositions
EMI10.1

Embodiment 2 shows an eyelid shade composition with a mixture of a glass powder with a particle size < 4 mu m and Mearlmica TM SVA.

The eyelid shade composition covers two phases, a phase A and a phase B. The phase A becomes dispersed in suitable mixing dispersion mechanisms mixed and. Then the ingredients of the phase become B into an auxiliary container given and there heated and mixed, until an uniform mixture results. Then the phase becomes B into the before-mixed phase A sprayed and these pulverized and mixed, until an uniform mixture results.

Embodiment 2

Eyelid shade composition
EMI11.1

The embodiments 3A and 3B show hair shampoo compositions, whereby a glass powder with a particle size < 5 mu m used became.

The initial pH value of the hair shampoo compositions in accordance with embodiment 3A amounted to during the hair shampoo composition I -8.3, during the hair shampoo composition II -4.6, during the hair shampoo composition III -3.9 and during the hair shampoo composition IV -3,5.

The initial pH values of the hair shampoo compositions in accordance with embodiment 3B amounted to during composition I -8.9, during composition II -8.2, during composition III -5.7, and during the composition IV -4,8.

Embodiment 3A

Hair shampoo compositions
EMI12.1

Embodiment 3B

Hair shampoo compositions
EMI13.1

The embodiments 4A, 4B and 4C show embodiments for lip pin compositions. With the embodiment in accordance with Fig. 4A became a glass powder with a particle size < 4 mu m with 5 Gew. - % as ingredient used. Altogether the lip pin composition is in accordance with embodiment 4A a three-phase system.

The preparing the composition of made by a cradles all ingredients of the phase A into a heated a vessel and raising of the temperature on 85 +-3 degree Celsius, agitate the phase, until these molten and uniform was. Addition of the phase B and mixing, until all Perl pigments are good dispersed. Then addition of the phase C and mixing bottom constant agitation. Then pouring off with 75 +-5 degree Celsius. Then melts, cool ones and lamps of the lipsticks.

The embodiments 4B and 4C show lip pin compositions with glass powder with a particle size < 1,6 mu m and in embodiment 4C lip pin compositions with glass powders with particle sizes < 4 mu m, < 1,6 mu m and < 0,7 mu M.

Embodiment 4A

Lip pin composition
EMI14.1

Embodiment 4B

Lip pin compositions
EMI15.1

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Embodiment 4C

Lip pin compositions
EMI16.1

Embodiment 5 is an embodiment of a face mask composition existing from two phases, a phase A and a phase B, whereby the phase B a glass powder with particle size < 4 mu m with a portion of 10 Gew. - % covers. First the acrylate becomes copolymer Carbopol Aqua SF-1 and deionisiertes and/or. deionized water bottom moderate agitation mixed. Then predispergieren the glass powder with glycerol in a separate vessel, until the mixture is soft and uniform, then addition of water and mixing for 15 to 20 minutes with small heating of approximate 40 degree Celsius. Addition of phenoxyethanol and Flamenco Satin Pearl 3500. Subsequent mixing, until an uniform mixture results. In a final step the phase becomes A of the phase B bottom vigorous agitation added.

Embodiment 5

Face mask compositions
EMI17.1

Embodiment 6 indicates a make-up primer cream composition as altogether 5 phases A, B, C, D and E, whereby the phase D glass powder with particle sizes < 1,6 mu m and/or 0.7 mu m covers.

Embodiment 6

Make-up primer cream compositions
EMI18.1

Embodiment 7 shows a nail lacquer composition with a glass powder with particle sizes < 4 mu M. The nail lacquer composition is a single-phase composition, with which all components in a vessel with a Lightnin Propellerrührer mixed becomes, until an uniform mixture becomes achieved.

Embodiment 7

Nail lacquer composition

EMI19.1

In the embodiment 8 is a Rouge composition with altogether three phases A, B and C indicated. The phase A covers a glass powder with particle sizes < 4 mu M. The Rouge composition becomes obtained, as phase becomes A in suitable way mixed and dispersed. Then the ingredients of the phase B in an auxiliary container, which becomes heated, become mixed, until an uniform mixture results. Then the phase B becomes continuous mixed into the before-mixed phase A injected and.

Then the mixture from phase B and phase A pulverized and into the mixer is returned. Then the phase C is agitated to the mixture from phase A and B added and, until an uniform mixture adjusts itself.

Embodiment 8

Rouge composition
EMI21.1

All ingredients in the embodiments 1 to 8 are in accordance with CTFA international Buyersguide 2002 edited from John A. Wenninger and G. N. Mc Iwen, edited of The Cosmetic, Toiletery, and ask-climbs Association, 110117TH Street, N. W., Suite 300, Washington D. C, 20036-4702, volume 2, section 7, Technical/Trade/INCI name classified. The scope of this publication becomes at full extent into the present application with entrapped.

In place of glass powders can become in all indicated compositions also glass ceramic powders or bioactive glasses or composite materials comprising glass and nanoparticles used.

Altogether 21 embodiments for glass compositions of bioactive glasses and/or. Output glasses for glass ceramics are in table 1 in the appendix this application indicated. The glass compositions can become glass powders with the grain size specified above milled. In place of glass powders also glass ceramic powders comprising such output glasses or composite materials of comprising such output glasses and nanoparticles used can become.

With the present application for the first time formulations of cosmetic products with bioactive glasses and/or glass ceramics and/or glass powders and/or glass ceramic powders and/or composite materials become a comprising glass and nanoparticles indicated.

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